

N. Minnifield n

1645

RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/117,447

DATE: 06/12/2000

TIME: 16:05:34

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3 <110> APPLICANT: LUBITZ, Werner
4 SLEYTR, Uwe
5 KUEN, Beatrix
6 TRUPPE, Michaela
7 HOWORKA, Stefan
8 RESCH, Stepanka
9 SCHROLL, Gerhard
10 SARA, Margit
12 <120> TITLE OF INVENTION: RECOMBINANT EXPRESSION OF S-LAYER PROTEINS
14 <130> FILE REFERENCE: 100564-08013
16 <140> CURRENT APPLICATION NUMBER: 09/117,447
17 <141> CURRENT FILING DATE: 1998-12-02
19 <150> PRIOR APPLICATION NUMBER: PCT/EP97/00432
20 <151> PRIOR FILING DATE: 1997-01-31
22 <150> PRIOR APPLICATION NUMBER: DE/196 03 649.6
23 <151> PRIOR FILING DATE: 1996-02-01
25 <160> NUMBER OF SEQ ID NOS: 10
27 <170> SOFTWARE: PatentIn Ver. 2.1
29 <210> SEQ ID NO: 1
30 <211> LENGTH: 3687
31 <212> TYPE: DNA
32 <213> ORGANISM: Bacillus stearothermophilus
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40 <222> LOCATION: (1)..(90)
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51 gca agt gca ttt gtc gct gca aat cca aac gct tct gaa gcg gct aca 96
52 Ala Ser Ala Phe Val Ala Ala Asn Pro Asn Ala Ser Glu Ala Ala Thr
53 -10 -5 -1 1
55 gat gta gca aca gta gta agc caa gca aaa gca cag ttc aaa aaa gca 144
56 Asp Val Ala Thr Val Val Ser Gln Ala Lys Ala Gln Phe Lys Lys Ala
57 5 10 15
59 tac tat act tac agc cat aca gta acg gaa act ggt gaa ttc cca aac 192
60 Tyr Tyr Thr Tyr Ser His Thr Val Thr Glu Thr Gly Glu Phe Pro Asn
61 20 25 30
63 att aac gat gta tat gct gaa tac aac aaa gcg aaa aaa cga tac cgt 240
64 Ile Asn Asp Val Tyr Ala Glu Tyr Asn Lys Ala Lys Lys Arg Tyr Arg
65 35 40 45 50

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68 Asp Ala Val Ala Leu Val Asn Lys Ala Gly Gly Ala Lys Lys Asp Ala
69          55          60          65
71 tac tta gct gat tta caa aaa gaa tat gaa act tac gtt ttc aaa gca 336
72 Tyr Leu Ala Asp Leu Gln Lys Glu Tyr Glu Thr Tyr Val Phe Lys Ala
73          70          75          80
75 aac cct aaa tct ggc gaa gct cgt gta gca act tac atc gat gct tac 384
76 Asn Pro Lys Ser Gly Glu Ala Arg Val Ala Thr Tyr Ile Asp Ala Tyr
77          85          90          95
79 aac tat gca aca aaa tta gac gaa atg cgc caa gag cta gag gct gct 432
80 Asn Tyr Ala Thr Lys Leu Asp Glu Met Arg Gln Glu Leu Glu Ala Ala
81          100          105          110
83 gtt caa gca aaa gat tta gaa aaa gca gaa caa tac tat cac aaa att 480
84 Val Gln Ala Lys Asp Leu Glu Lys Ala Glu Gln Tyr Tyr His Lys Ile
85          115          120          125          130
87 cct tat gaa att aaa act cgc aca gtc att tta gat cgc gta tat ggt 528
88 Pro Tyr Glu Ile Lys Thr Arg Thr Val Ile Leu Asp Arg Val Tyr Gly
89          135          140          145
91 aaa aca act cgt gat tta ctt cgc tct aca ttt aaa gca aaa gca caa 576
92 Lys Thr Thr Arg Asp Leu Leu Arg Ser Thr Phe Lys Ala Lys Ala Gln
93          150          155          160
95 gaa ctt cgc gac agc tta att tat gat att acc gtt gca atg aaa gcg 624
96 Glu Leu Arg Asp Ser Leu Ile Tyr Asp Ile Thr Val Ala Met Lys Ala
97          165          170          175
99 cgc gaa gta caa gac gct gtg aaa gca ggc aat tta gac aaa gct aaa 672
100 Arg Glu Val Gln Asp Ala Val Lys Ala Gly Asn Leu Asp Lys Ala Lys
101          180          185          190
103 gct gct gtt gat caa atc aat caa tac tta cca aaa gta aca gat gct 720
104 Ala Ala Val Asp Gln Ile Asn Gln Tyr Leu Pro Lys Val Thr Asp Ala
105          195          200          205          210
107 ttc aaa act gaa cta aca gaa gta gcg aaa aaa gca tta gat gca gat 768
108 Phe Lys Thr Glu Leu Thr Glu Val Ala Lys Lys Ala Leu Asp Ala Asp
109          215          220          225
111 gaa gct gcg ctt act cca aaa gtt gaa agt gta agt gcg att aac act 816
112 Glu Ala Ala Leu Thr Pro Lys Val Glu Ser Val Ser Ala Ile Asn Thr
113          230          235          240
115 caa aac aaa gct gtt gaa tta aca gca gta cca gtg aac gga aca cta 864
116 Gln Asn Lys Ala Val Glu Leu Thr Ala Val Pro Val Asn Gly Thr Leu
117          245          250          255
119 aaa tta caa ctt tca gct gct gca aat gaa gat aca gta aac gta aat 912
120 Lys Leu Gln Leu Ser Ala Ala Ala Asn Glu Asp Thr Val Asn Val Asn
121          260          265          270
123 act gta cgt atc tat aaa gtg gac ggt aac att cca ttt gcc ctt aat 960
124 Thr Val Arg Ile Tyr Lys Val Asp Gly Asn Ile Pro Phe Ala Leu Asn
125          275          280          285          290
127 acg gca gat gtt tct tta tct aca gac gga aaa act atc act gtg gat 1008
128 Thr Ala Asp Val Ser Leu Ser Thr Asp Gly Lys Thr Ile Thr Val Asp
129          295          300          305
131 gct tca act cca ttc gaa aat aat acg gag tat aaa gta gta gtt aaa 1056

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132 Ala Ser Thr Pro Phe Glu Asn Asn Thr Glu Tyr Lys Val Val Val Lys
133          310          315          320
135 ggt att aaa gac aaa aat ggc aaa gaa ttt aaa gaa gat gca ttc act 1104
136 Gly Ile Lys Asp Lys Asn Gly Lys Glu Phe Lys Glu Asp Ala Phe Thr
137          325          330          335
139 ttc aag ctt cga aat gat gct gta gtt act caa gtg ttt gga act aat 1152
140 Phe Lys Leu Arg Asn Asp Ala Val Val Thr Gln Val Phe Gly Thr Asn
141          340          345          350
143 gta aca aac aac act tct gta aac tta gca gca ggt act ttc gac act 1200
144 Val Thr Asn Asn Thr Ser Val Asn Leu Ala Ala Gly Thr Phe Asp Thr
145 355          360          365          370
147 gac gat act tta aca gta gta ttt gat aag ttg tta gca cct gaa act 1248
148 Asp Asp Thr Leu Thr Val Val Phe Asp Lys Leu Leu Ala Pro Glu Thr
149          375          380          385
151 gta aac agc tcg aac gtt act att aca gat gtt gaa act gga aaa cgc 1296
152 Val Asn Ser Ser Asn Val Thr Ile Thr Asp Val Glu Thr Gly Lys Arg
153          390          395          400
155 att cca gta att gca tct act tct ggt tct aca att act att acg tta 1344
156 Ile Pro Val Ile Ala Ser Thr Ser Gly Ser Thr Ile Thr Ile Thr Leu
157          405          410          415
159 aaa gaa gcg tta gta act ggt aaa caa tat aaa ctt gct atc aat aat 1392
160 Lys Glu Ala Leu Val Thr Gly Lys Gln Tyr Lys Leu Ala Ile Asn Asn
161          420          425          430
163 gtt aaa aca tta act ggt tac aat gca gaa gct tac gag tta gtg ttc 1440
164 Val Lys Thr Leu Thr Gly Tyr Asn Ala Glu Ala Tyr Glu Leu Val Phe
165 435          440          445          450
167 act gca aac gca tca gca cca act gtt gct acc gct cct act act tta 1488
168 Thr Ala Asn Ala Ser Ala Pro Thr Val Ala Thr Ala Pro Thr Thr Leu
169          455          460          465
171 ggt ggt aca act tta tct act ggt tct ctt aca aca aat gtt tgg ggt 1536
172 Gly Gly Thr Thr Leu Ser Thr Gly Ser Leu Thr Thr Asn Val Trp Gly
173          470          475          480
175 aaa ttg gct ggt ggt gtg aat gaa gct gga act tat tat cct ggt ctt 1584
176 Lys Leu Ala Gly Gly Val Asn Glu Ala Gly Thr Tyr Tyr Pro Gly Leu
177          485          490          495
179 caa ttc aca aca acg ttt gct act aag tta gac gaa tct act tta gct 1632
180 Gln Phe Thr Thr Thr Phe Ala Thr Lys Leu Asp Glu Ser Thr Leu Ala
181          500          505          510
183 gat aac ttt gta tta gtt gaa aaa gaa tct ggt aca gtt gtt gct tct 1680
184 Asp Asn Phe Val Leu Val Glu Lys Glu Ser Gly Thr Val Val Ala Ser
185 515          520          525          530
187 gaa cta aaa tat aat gca gac gct aaa atg gta act tta gtg cca aaa 1728
188 Glu Leu Lys Tyr Asn Ala Asp Ala Lys Met Val Thr Leu Val Pro Lys
189          535          540          545
191 gcg gac ctt aaa gaa aat aca atc tat caa atc aaa att aaa aaa ggc 1776
192 Ala Asp Leu Lys Glu Asn Thr Ile Tyr Gln Ile Lys Ile Lys Lys Gly
193          550          555          560
195 ttg aag tcc gat aaa ggt att gaa tta ggc act gtt aac gag aaa aca 1824
196 Leu Lys Ser Asp Lys Gly Ile Glu Leu Gly Thr Val Asn Glu Lys Thr

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197	565	570	575	
199	tat gag ttc aaa act caa gac tta act gct cct aca gtt att agc gta	1872		
200	Tyr Glu Phe Lys Thr Gln Asp Leu Thr Ala Pro Thr Val Ile Ser Val			
201	580	585	590	
203	acg tct aaa aat ggc gac gct gga tta aaa gta act gaa gct caa gaa	1920		
204	Thr Ser Lys Asn Gly Asp Ala Gly Leu Lys Val Thr Glu Ala Gln Glu			
205	595	600	605	610
207	ttt act gtg aag ttc tca gag aat tta aat aca ttt aat gct aca acc	1968		
208	Phe Thr Val Lys Phe Ser Glu Asn Leu Asn Thr Phe Asn Ala Thr Thr			
209	615	620	625	
211	gtt tcg ggt agc aca atc aca tac ggt caa gtt gct gta gta aaa gcg	2016		
212	Val Ser Gly Ser Thr Ile Thr Tyr Gly Gln Val Ala Val Val Lys Ala			
213	630	635	640	
215	ggt gca aac tta tct gct ctt aca gca agt gac atc att cca gct agt	2064		
216	Gly Ala Asn Leu Ser Ala Leu Thr Ala Ser Asp Ile Ile Pro Ala Ser			
217	645	650	655	
219	gtt gaa gcg gtt act ggt caa gat gga aca tac aaa gtg aaa gtt gct	2112		
220	Val Glu Ala Val Thr Gly Gln Asp Gly Thr Tyr Lys Val Lys Val Ala			
221	660	665	670	
223	gct aac caa tta gaa cgt aac caa ggg tac aaa tta gta gtg ttc ggt	2160		
224	Ala Asn Gln Leu Glu Arg Asn Gln Gly Tyr Lys Leu Val Val Phe Gly			
225	675	680	685	690
227	aaa ggt gca aca gct cct gtt aaa gat gct gca aat gca aat act tta	2208		
228	Lys Gly Ala Thr Val Lys Thr Phe Thr Thr Thr Thr Thr Thr Thr			
229	695	700	705	
231	gca act aac tat atc tat aca ttt aca act gaa ggt caa gac gta aca	2256		
232	Ala Thr Asn Tyr Ile Tyr Thr Phe Thr Thr Thr Thr Thr Thr Thr			
233	710	715	720	
235	gca cca acg gtt aca aaa gta ttc aaa ggt gat tct tta aaa gac gct	2304		
236	Ala Pro Thr Val Thr Lys Val Phe Lys Gly Asp Ser Leu Lys Asp Ala			
237	725	730	735	
239	gat gca gtt act aca ctt acg aac gtt gat gca ggt caa aaa ttc act	2352		
240	Asp Ala Val Thr Thr Leu Thr Asn Val Asp Ala Gly Gln Lys Phe Thr			
241	740	745	750	
243	atc caa ttt agc gaa gaa tta aaa act tct agt ggt tct tta gtg ggt	2400		
244	Ile Gln Phe Ser Glu Glu Lys Thr Ser Ser Gly Ser Leu Val Gly			
245	755	760	765	770
247	ggc aaa gta act gtc gag aaa tta aca aac aac gga tgg gta gat gct	2448		
248	Gly Lys Val Thr Val Glu Lys Leu Thr Asn Asn Gly Trp Val Asp Ala			
249	775	780	785	
251	ggt act gga aca act gta tca gtt gct cct aag aca gat gca aat ggt	2496		
252	Gly Thr Gly Thr Thr Val Ser Val Ala Pro Lys Thr Asp Ala Asn Gly			
253	790	795	800	
255	aaa gta aca gct gct gtg gtt aca tta act ggt ctt gac aat aac gac	2544		
256	Lys Val Thr Ala Ala Val Val Thr Leu Thr Gly Leu Asp Asn Asn Asp			
257	805	810	815	
259	aaa gat gcg aaa ttg cgt ctg gta gta gat aag tct tct act gat gga	2592		
260	Lys Asp Ala Lys Leu Arg Leu Val Val Asp Lys Ser Ser Thr Asp Gly			
261	820	825	830	

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263 att gct gat gta gct ggt aat gta att aag gaa aaa gat att tta att 2640
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265 835 840 845 850
267 cgt tac aac agc tgg aga cac act gta gct tct gtg aaa gct gct gct 2688
268 Arg Tyr Asn Ser Trp Arg His Thr Val Ala Ser Val Lys Ala Ala Ala
269 855 860 865
271 gac aaa gat ggt caa aac gct tct gct gca ttc cca aca agc act gca 2736
272 Asp Lys Asp Gly Gln Asn Ala Ser Ala Ala Phe Pro Thr Ser Thr Ala
273 870 875 880
275 att gat aca act aag agc tta tta gtt gaa ttc aat gaa act gat tta 2784
276 Ile Asp Thr Thr Lys Ser Leu Leu Val Glu Phe Asn Glu Thr Asp Leu
277 885 890 895
279 gcg gaa gtt aaa cct gag aac atc gtt gtt aaa gat gca gca ggt aat 2832
280 Ala Glu Val Lys Pro Glu Asn Ile Val Val Lys Asp Ala Ala Gly Asn
281 900 905 910
283 gcg gta gct ggt act gta aca gca tta gac ggt tct aca aat aaa ttt 2880
284 Ala Val Ala Gly Thr Val Thr Ala Leu Asp Gly Ser Thr Asn Lys Phe
285 915 920 925 930
287 gta ttc act cca tct caa gaa tta aaa gct ggt aca gtt tac tct gta 2928
288 Val Phe Thr Pro Ser Gln Glu Leu Lys Ala Gly Thr Val Tyr Ser Val
289 935 940 945
291 aca att gac ggt gtg aga gat aaa gta ggt aac aca atc tct aaa tac 2976
292 Thr Ile Asp Gly Val Arg Asp Lys Val Gly Asn Thr Ile Ser Lys Tyr
293 950 955 960
295 att act tcg ttc aag act gta tct gcg aat cca acg tta tct tca atc 3024
296 Ile Thr Ser Phe Lys Thr Val Ser Ala Asn Pro Thr Leu Ser Ser Ile
297 965 970 975
299 agc att gct gac ggt gca gtt aac gtt gac cgt tct aaa aca att aca 3072
300 Ser Ile Ala Asp Gly Ala Val Asn Val Asp Arg Ser Lys Thr Ile Thr
301 980 985 990
303 att gaa ttc agc gat tca gtt cca aac cca aca atc act ctt aag aag 3120
304 Ile Glu Phe Ser Asp Ser Val Pro Asn Pro Thr Ile Thr Leu Lys Lys
305 995 1000 1005 1010
307 gct gac gga act tca ttt act aat tac act tta gta aat gta aat aat 3168
308 Ala Asp Gly Thr Ser Phe Thr Asn Tyr Thr Leu Val Asn Val Asn Asn
309 1015 1020 1025
311 gaa aat aaa aca tac aaa att gta ttc cac aaa ggt gta aca ctt gac 3216
312 Glu Asn Lys Thr Tyr Lys Ile Val Phe His Lys Gly Val Thr Leu Asp
313 1030 1035 1040
315 gag ttt act caa tat gag tta gca gtt tca aaa gat ttt caa act ggt 3264
316 Glu Phe Thr Gln Tyr Glu Leu Ala Val Ser Lys Asp Phe Gln Thr Gly
317 1045 1050 1055
319 act gat att gat agc aaa gtt aca ttc atc aca ggt tct gtt gct act 3312
320 Thr Asp Ile Asp Ser Lys Val Thr Phe Ile Thr Gly Ser Val Ala Thr
321 1060 1065 1070
323 gac gaa gta aaa cct gct cta gta ggc gtt ggt tca tgg aat gga aca 3360
324 Asp Glu Val Lys Pro Ala Leu Val Gly Val Gly Ser Trp Asn Gly Thr
325 1075 1080 1085 1090
327 agc tat act cag gat gct gca gca aca cga ctt cgg tct gta gct gac 3408

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